REPORT

FOR THE YEAR 1902,

PRESENTED TO THE

NEWARK

RURAL DISTRICT COUNCIL

BY

FRANK BROADBENT,

M.R.C.S. Eng., L.R.C.P., Edinburgh,

MEDICAL OFFICER OF HEALTH;

AND A

SPECIAL REPORT

On the Collingham Water Supply.

NEWARK:

PRINTED BY J. PERFECT, MARKET PLACE.

1903.

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TO THE

Rural District Council of Newark.

FEBRUARY, 1903.

GENTLEMEN,

I beg to submit to you my Eighth Annual Report for the Rural District Council of Newark. The population, according to the Census of 1901, is 7738. The acreage is 36,619, and during the year there have been 107 deaths and 220 births. The birth rate was 28·5 per 1000 against 29 for last year. The death rate was 13·8 against 12·7 for last year, 0·5 less the average for the last 7 years. The death rate for children under one year was 242·9 against 171·7 per 1000 of the total deaths. The deaths of children under one year was 118·1 against 75·5 per 1000 of the registered births for last year. The deaths of children between 1 and 5 years amounted to 65·4 against 60·6 for last year. The deaths of persons of 65 and upwards amounted to 383·1 per 1000 of the total deaths against 434·3 for last year, and among these I notice 3 over 90, 8 over eighty, and 19 over 70 years of age. The principle Zymotic Disease which caused death was Diphtheria one, a death rate of ·1 against ·2 for last year, ·5 for the year before. There has been no Small Pox in the district, and the Authority have seen that hand-bills have been circulated all through the district,

and a good deal of re-vaccination has been done. As predicted at the time by the Medical Officers' of Health, Small Pox has abated in London and has now invaded the provinces and we may at any time be called on to cope with an outbreak. The Authority are making terms with the Newark Corporation for providing an Infectious Hospital, but I do not see how that will affect the question of Small Pox, which, in my opinion ought to be dealt with separately by the County Council. Scarlet Fever has again not become epidemic in the district and no Schools have had to be closed. Isolated cases have been reported from Balderton in January, September, and December, Coddington in February, Collingham in March, Cotham in November, Besthorpe in August, Tolney Lane in August and November, South Clifton in August, Harby in September, and Farndon in October and November. Diphtheria and Membranous Croup have been reported from New Balderton in September and October, and from Brough and Hawton in August. There was a death from Diphtheria in New Balderton in October. I hope that when the Drainage Scheme for Balderton is completed the terraces in New Balderton will put in water closets. If they fail to do so, it would be worth while for Balderton to have Public Scavenging, as the private owners empty the privies very irregularly and badly, and thus create a ready focus for Diphtheria and other infectious diseases.

Single cases of Erysipelas have been reported from Farndon in January, Tolney Lane in January, Balderton in March and September, Harby in April, Barnby in July, South Collingham, Besthorpe, and Coddington in August.

South Clifton School has been closed in May on account of Measles, Farndon in November on account of Mumps and Whooping Cough, and Collingham Schools in December on account of Mumps and Whooping Cough. Phthisis caused 8 deaths.

Balderton Drainage Scheme is proceeding as rapidly as possible.

I have made a survey of the whole district in October, accompanied by your Inspector, and have visited the bakers, butchers shops, milk sellers and factories in the district.

Your Inspector has collected, and I have qualitatively analysed 13 samples of water, 9 were good, 3 bad, and one suspicious. Appended are the Tables provided by the Local Government Board, and the rainfall kindly supplied by the Rev. E. C. Shawfield, of South Scarle Vicarage, and a short digest of your Inspector's work.

I have the honour to be, Gentlemen,

Your obedient Servant,

FRANK BROADBENT.

Newark Rural District Council.

REPORT OF THE INSPECTOR OF NUISANCES,

For the Year ending December 31st, 1902.

Nuisances reported...	32
,, abated	23
,, unabated at end of year	9
Official Notices issued	4
Cases prosecuted by Authority	0
Newark water supply adopted	1
New drains provided	3
New privies provided	2
Houses stoved and disinfected	12

I have inspected all Bakehouses, Slaughterhouses, and Registered Cowsheds in the district, the last on two occasions. Their general condition is satisfactory.

I have prepared an amended set of Bye-laws as to Cow-sheds, the existing ones being in my opinion to indefinite and inadequate. They still await the consideration of the Council.

Under the new Factory and Workshops Act, I have inspected and compiled a Register of all Workshops within the district.

R. OAKDEN, Junr.,

Inspector of Nuisances.

TABLE I.

NEWARK RURAL DISTRICT COUNCIL.

Vital Statistics of Whole District during 1902 and Previous Years.

Year.	Population estimated to Middle of each Year.	Births.		Deaths under One Year of Age.		Deaths at all Ages. Total.		Deaths in Public Institutions.	Deaths of Non-residents registered in District.	Deaths of Residents registered beyond District.	Deaths at all ages nett.	
		Number.	Rate.	Number.	Rate per 1,000 Births registered.	Number.	Rate.				Number	Rate.
1895	7093	156	21·9	21	134·6	101	14·2	0	0	0	101	14·2
1896	7093	187	26·3	23	122·9	101	14·2	0	0	0	101	14·2
1897	7093	206	28·5	20	97	108	14·9	0	0	0	108	14·9
1898	7207	197	27·3	24	121·8	101	14	0	0	0	101	14
1899	7207	181	25·1	16	88·3	100	13·8	0	0	0	100	13·8
1900	7207	196	27·1	18	91·8	118	16·3	0	0	0	118	16·3
1901	7738	225	29	17	75·5	99	12·7	0	0	0	99	12·7
Averages for years 1892-1901.	7234	192·5	26·4	19·8	104·5	104	14·3	0	0	0	104	14·3
1902	7738	220	28·5	26	118·1	107	13·8	0	0	0	107	13·8

Area of District in acres (exclusive of area covered by water) 36619. Total Population at all ages 7738 ; Number of inhabited houses 1795 ; Average number of persons per house 4, at Census of 1901.

TABLE III.

NEWARK RURAL DISTRICT COUNCIL.

Cases of Infectious Disease notified during the Year 1902.

NOTIFIABLE DISEASE.	Cases Notified in Whole District.							Total Cases Notified in Each Locality	No. of Cases removed to Hospital from Each Locality
	At all Ages.	At Ages— Years.						1	1
		Under 1.	1 to 5.	5 to 15.	15 to 25.	25 to 65.	65 and upwards.		
Small Pox	...	...	...	...	...	...	...		
Cholera	...	...	...	...	...	...	...		
Diphtheria	...	...	...	...	...	...	...		
Membranous Croup ...	3	1	1	1	...	...	...		
Erysipelas	12	...	...	2	3	5	2		
Scarlet Fever	36	5	15	10	4	2	0	NIL.	NIL.
Typhus Fever	...	...	...	...	...	...	...		
Enteric Fever	...	...	...	...	...	...	...		
Relapsing Fever ...	...	...	...	...	...	...	...		
Continued Fever ...	...	...	...	...	...	...	...		
Puerperal Fever... ...	...	...	...	...	...	...	...		
Plague	...	...	...	...	...	...	...		
Totals	51	6	16	13	7	7	2		

Isolation Hospital—None

TABLE IV.

NEWARK RURAL DISTRICT COUNCIL.

Causes of, and Ages at, Death during Year 1902.

Causes of Death.	DEATHS IN WHOLE DISTRICT AT SUBJOINED AGES.															
	Measles.	Whooping Cough.	Diphtheria and Membranous Croup.	Erysipelas.	Phthisis.	Other tubercular diseases.	Cancer, malignant disease.	Bronchitis.	Pneumonia.	Alcoholism Cirrhosis of liver.	Diseases and accidents of parturition.	Heart diseases.	Accidents.	Suicides.	All other causes.	All causes.
All ages	1	1	1	1	4	2	4	12	9	3	1	9	2	2	55	107
Under 1 year ...	...	...	...	...	...	1	...	4	2	...	...	...	1	...	18	26
1 and under 5 ...	...	1	...	...	...	...	...	1	...	...	...	...	...	...	5	7
5 and under 15...	...	...	1	...	...	...	...	...	...	...	...	1	...	1	...	3
15 and under 25	...	...	...	...	3	...	...	...	...	...	1	...	1	1	...	6
25 and under 65	1	...	...	1	1	1	2	3	2	2	...	4	...	...	7	24
65 and upwards...	...	...	...	...	...	...	2	4	5	1	...	4	...	...	25	41

RAINFALL IN 1902.

At SOUTH SCARLE, in the County of Notts.

Rain Gauge { Diameter of Funnel Five Inches
Height of top { Above Ground 1 ft. 4 in.
Above Sea Level 52 ft.

Month.	Total Depth.	Greatest fall in 24 Hours.		Number of Days on which ·01 or more fell.
	Inches.	Depth.	Date.	
January	·64	·21	4	7
February	1·66	·31	24	12
March	·99	·58	14	9
April	1·59	·60	5	11
May	2·09	·38	15	18
June	1·77	·55	12	13
July	1·26	·35	25	8
August	2·14	·53	7	14
September	·43	·28	10	6
October	1·77	·36	13	19
November	1·48	·30	30	11
December	1·54	·66	1	13
TOTALS	17·36	—	—	141

E. C. SHAWFIELD.

Average Rainfall for 9 years 20·91.

Average number of Rainy Days 141.

SPECIAL REPORT

ON THE

HEALTH AND WATER SUPPLY OF COLLINGHAM,

BY

FRANK BROADBENT,

Medical Officer of Health,

AND

REPORTS OF FOUR ANALYSTS.

Collingham is a decreasing residential and agricultural village lying in the valley of the Trent. The population of the two parishes is 1580, but that in the area of a public water supply is about 1190. I have examined the death statistics of these 1190 people for the last twelve years, but cannot say they teach anything. The average death rate 18·5 per 1000, against 14·2 for the whole district proves nothing. Collingham is a residential village for old people of all classes, and the increase in the death rate is accounted for by that fact. The only water borne disease that seems unduly prevalent is goitre. I have an impression that the health and energy of the inhabitants is below the average, but this would be impossible to prove. Lying in a valley and the floods coming up to the village, the drainage has been principally subsoil, especially as there is very good permeable gravel at a short distance down. The surface of the water in most of the wells is about seven feet from the ground level, and apparently there are no deep springs, the only

deep excavation I have seen came to an impermeable bed of gravel clay about 18 feet down. This subsoil drainage has been going on at least fifty years, and also during that time Collingham has grown a very great quantity of vegetable crops, and consequently has used an enormous amount of strong manure, such as Nottingham night soil. During the fifteen years I have been Medical Officer of Health I have made frequent qualitative analyses of the well water of Collingham, and have observed that it has been steadily deteriorating. As early as 1893 a resident permitted me to examine the report of an analyst on two good wells and it was unfavourable, but till Newark obtained a bountiful and wholesome water supply and brought it as far as Winthorpe there seemed to be no remedy for the present state of affairs. During the last three months eleven wells from different parts of the village have been examined by four different and independent analysts, and they are unanimous in condemning the water supply. By my own observations, and by the report of the analysts which I append, it is absolutely certain that, with the subsoil drainage and also the extensive manuring, the whole of the water bearing area is polluted, and there is no means of remedying this state of affairs but by obtaining a public supply. I should suggest that the Council approach the Newark Corporation, and if is not feasable for them to supply the village, a competent water engineer be consulted.

FRANK BROADBENT,

Medical Officer of Health.

The Laboratory,
11, Billiter Square, E.C.,
London, Feb. 16th, 1903.

REPORT

On Eight Samples of Water, received on February 10th, from Dr. Frank Broadbent, North Collingham, Newark.

The results of analysis given in the following report are expressed in parts per 100,000. For their proper understanding it may be premised, that although no definite limits can be laid down for the composition of pure water, whereby all water-supplies could fairly be judged, the amount of chlorine, unless in estuary-waters, is rarely higher than 3, that the nitric acid is never higher than 4, that the proportions of free and albuminoid ammonia should not be larger than 0.005 and about 0.01 (except in peat-waters, where albuminoid ammonia is often much higher), the oxygen absorbed from permanganate about 0.05 and the total solids not above 30 or 40. In sewage-polluted waters the chlorine rises together with sulphate and total solids, while there is shown either an excess of the ammonias or of nitric acid, or both, according to the amount of oxidation undergone by the polluting matter during filtration through the soil.

	1	2	3	4
Chlorine	15.60	3.00	4.40	7.40
Sulphuric Acid	15.16	7.16	8.20	12.68
Nitric Acid	30.96	6.94	12.36	21.56
Phosphoric Acid ...	trace.	heavy trace.	very heavy.	very heavy.

	1	2	3	4
Free Ammonia ...	0.0018	0.0024	0.0020	0.0059
Albuminoid Ammonia	0.0270	0.0140	0.0138	0.0204
Oxygen absorbed from Permanganate in 15 mintues at 80 F.	0.0720	0.0328	0.0364	0.0716
In 4 hours	0.1756	0.0585	0.0752	0.1584
Total Solids, dried at 212 F.	125.60	38.80	54.40	86.80
Loss on Ignition ...	13.60	8.00	8.56	12.00
Total Hardness ...	46.1	1.94	24.5	42.8
Colour	v. yellow.	ft. yellow.	ft. green.	v. yellow.

	5	6	7	8
Chlorine	3.90	9.00	8.10	4.70
Sulphuric Acid ...	8.72	12.40	16.00	8.96
Nitric Acid	10.78	22.50	27.19	12.20
Phosphoric Acid ...	v. heavy.	v. heavy.	v. heavy.	heavy.
Free Ammonia ...	0.0022	0.0017	0.0020	0.0024
Albuminoid Ammonia	0.0191	0.0200	0.0147	0.0108
Oxygen absorbed, 15 minutes	0.0520	0.0908	0.0424	0.0308
In 4 hours	0.1256	0.1604	0.1024	0.0616
Total Solids, dried at 212 F.	50.40	99.60	102.40	52.80
Loss on Ignition ...	10.80	15.76	15.60	6.40
Total Hardness ...	24.5	44.9	46.9	22.0
Colour	yellow.	v. yellow.	ft. yellow.	ft. blue.

REMARKS.

Not one of the eight samples comes anywhere near the rough standards of purity referred to above. The amounts of nitric acid, in particular, are all very excessive and prove most conclusively that the eight samples are sewage-polluted. The formation of nitric acid shows that the nitrogenous portion of the sewage

has undergone oxidation and thus far purification. But in most samples the oxidation is far from perfect, as is shown by the excess of albuminoid ammonia and of oxygen absorbed in four hours.

Quite undrinkable are the following : Samples 1, 4, 5, 6, and 7. Samples 2, 3, and 8 are more completely oxidised, especially 8, which is by far the best of the samples, though itself highly unsatisfactory.

If there is any choice of water-supply in the district I would say without hesitation, that the use of the eight wells from which these samples were taken should at once be discontinued. If there is no choice for the present, I would adandon numbers 1, 4, 5, 6, and 7 at once, and as soon as practicable the three others.

Sewage-polluted water is not necessarily injurious. Such water may often be drunk with impunity for many years, especially by persons immuned by long use. But the completion of natural oxidation can never be quite relied upon, as from many causes, such as heavy rainfall, strong frost, or disturbance of the soil of the neighbourhood of the well, the unoxidised sewage may at any time make its appearance in the supply. If such sewage should happen to be infected with pathogenic organisms an outbreak of illness would naturally follow. The only prudent course, therefore, is to adandon supplies that are polluted, and in the present case it is much to be hoped, in the interests of the health of the inhabitants, that an alternative supply is available. If not, it is a matter of urgency that a pure supply be sought and obtained.

OTTO HEHNER.

ANALYTICAL REPORT.

From Wyleys, Limited,
Analytical and Operative Chemists,
Coventry.

Sample received from Dr. Broadbent, North Collingham.

We have examined the Three Samples of Water, with results as under :

	No. 1.	No. 2.	No. 3.
Total Solids, grains per gallon Dried at 212° F.	74.	45.5	41.0
Free Ammonia, parts per million	.036	.024	.028
Albuminoid Ammonia ,,	.330	.275	.366
Chlorine in Chlorides ,,	92.0	51.0	48.0
Nitrogen as Nitrates ,,	46.1	26.3	16.5

No. 1. This water contains a large amount of "total solids." The figures for "Chlorine as Chlorides" are also high, with a considerable excess of "Nitrogen as Nitrates." The "Albuminoid Ammonia" is likewise very excessive. We should regard it as a typically bad water, and unfit for domestic use.

No. 2 and No. 3. These waters are very similar in composition. No excessive amount of "Chlorine as Chlorides," but a large quantity of "Albuminoid Ammonia," showing considerable contamination by organic matter. The figures for "Nitrogen as Nitrates" are also distinctly high, particularly in the case of No. 2. We should regard both waters as distinctly bad and unfit for drinking.

(Signed) For WYLEYS, Limited,
H. W. JONES, F.C.S., Director.

Analytical Laboratory,
22, Tudor Street,
New Bridge Street,
London, E.C., Nov. 17th, 1902.

Dr. Augustus Voeloker & Sons.

Result of Analysis

Of a Sample of Water (No. 1) sent on Oct. 31st, 1902, by F. Broadbent, Esq., North Collingham, Newark.

	Sample No. 1. *Grains per Gallon.*
Total solid residue	70.00
Oxygen absorbed by Oxidisable Organic Matter	.11
Lime	13.05
Magnesia	3.81
Sulphuric Acid	9.31
Nitrogen as Nitrates	4.52
Equal to Nitric Acid	17.46
Chlorine	5.88
Equal to Chloride of Sodium	9.68
Free Ammonia	.002
Albuminoid Ammonia	.0155

This sample was distinctly yellow coloured and contained some suspended organic matter. It is a highly contaminated impure supply.

(Signed)

AUGUSTUS VOELOKER & SONS.

Analytical Laboratory,
22, Tudor Street,
New Bridge Street,
London, E.C., Nov. 17th, 1902.

Dr. Augustus Voeloker & Sons.

Result of Analysis

Of a Sample of Water (No. 2) sent on Oct. 31st, 1902, by F. Broadbent, Esq., North Collingham, Newark.

	Sample No. 2. *Grains per Gallon.*
Total solid residue	47.32
Oxygen absorbed by Oxidisable Organic Matter	.07
Lime	9.74
Magnesia	2.39
Sulphuric Acid	7.42
Nitrogen as Nitrates	2.50
Equal to Nitric Acid	9.66
Chlorine...	3.29
Equal to Chloride of Sodium	5.43
Free Ammonia	None
Albuminoid	.011

This sample was not so polluted as No. 1, but it is in our opinion a badly contaminated water.

(Signed)

AUGUSTUS VOELOKER & SONS.

Analytical Laboratory,
22, Tudor Street,
New Bridge Street,
London, E.C., Nov. 17th, 1902,

Dr. Augustus Voeloker & Sons.

Result of Analysis

Of a Sample of Water (No. 3) sent on Oct. 31st, 1902, by F. Broadbent, Esq., North Collingham, Newark.

	Sample No. 3. *Grains per Gallon.*
Total solid residue	39.48
Oxygen absorbed by Oxidisable Organic Matter	.099
Lime	7·73
Magnesia	1.61
Sulphuric Acid	8.44
Nitrogen as Nitrates	1.81
Equal to Nitric Acid	6.99
Chlorine...	3.04
Equal to Chloride of Sodium	5.01
Free Ammonia	None
Albuminoid Ammonia	.0155

This sample is distinctly less polluted than No. 2, but is in our opinion decidedly contaminated and an unsatisfactory supply.

(Signed)

AUGUSTUS VOELOKER & SONS.

King's Walk Chambers,
Parliament Street,
Nottingham, Nov. 10th, 1902.

S. R. Trotman, M.A.F.I.C.,
City Analyst.

Report of Analysis of Water from Dr. Broadbent, October 28th, 1902.

These samples contains per 100,000 parts :—

	1	2	3
Total Solids	120.6	80.0	58.4
Chlorine	7.81	6.74	6.39
Nitric Nitrogen	5.98	3.24	2.19
Free Ammonia	0.010	0.016	0.010
Albuminoid Ammonia ...	0.033	0.026	0.033
Oxygen absorbed in 3 minutes	0.0396	0.0122	0.072

I am of opinion that all these waters are of a suspicious nature, and I should condemn them for drinking purposes. I have carefully considered these figures in connection with the information as to the geological formation, etc., supplied with the samples.

The Ammonia and Oxygen absorbed was in each case determined within an hour of receipt of samples.

(Signed)

SAMUEL R. TROTMAN.